

REMARKS

Claims 10, 13, 25, 30, 33, 38 and 40 are amended, no claims are canceled, and no claims are added; as a result, claims 10-38 and 40 are now pending in this application.

§102 Rejection of the Claims

Claims 10-16, 25-33, 38 and 40 were rejected under 35 USC § 102(b) as being anticipated by Grubisich (U.S. Patent No. 5,581,115). Applicant respectfully traverses this rejection.

The outstanding Office Action points to figure 2 of the cited reference and suggests that the region 58 is larger than the emitter and smaller than the base. Applicant submits that figure 2 is a prior art figure that is improperly or imprecisely drawn and that nothing in the specification indicates that the region 58 is any particular size. In particular, Applicant submits that there is no reason for the region 58 to be larger than the emitter 50, through which opening the region 58 is implanted, and that if the cited reference intended the prior art figure to have the indicated extent, the result would be a defective transistor since the higher N doping level of the region 58 is shown coming into close contact with the higher P doped regions 54, resulting in reduced base collector breakdown voltage and increased base collector leakage currents. Thus, since there is nothing in the specification of the cited reference to indicate that the region 58 could or should be as shown in a general prior art figure, Applicant submits that the cited figure is an improper and ambiguous reference, and that the proper teachings of the cited reference may be seen in figure 3A and 3B, which along with the specification at column 8, line 21 to column 10, line 62, clearly disclose that the region 88 is the same size as the emitter. Thus the figure 2 is an improper reference since it does not match the description in the specification.

Applicant has amended the claims to make the distinction between figure 2 of the cited reference and the claimed invention more clear. Specifically, independent claim 1 has been amended to recite “...*a base region having an impurity therein which promotes the other type of carrier, the base region having a surface area and extending downward from the surface of the substrate into contact with a portion of the collector region, the base region having at least a first, second and third region with the first and third base regions comprising base contact regions having a larger impurity level of the other type of carrier than the impurity level of the*

other type of carrier of the second base region disposed therebetween; an emitter on top of the second base region and having a surface area, which is in contact with the second base region, smaller than the surface area of the base region; and an implant area of the collector region vertically adjacent to the second base region having an increased collector doping of an implanted impurity, the implant area having an effective surface area, which is in contact with the second base region, greater than the surface area of the emitter and less than the surface area of the base region, and displaced from the first and third base regions ...". Thus the claim now clearly has the second base region 918 separating the higher doped first and second base regions 1214 and the implanted region 1020 is larger than the emitter region 1114, and smaller than the second base region 918 and not near the first and third base regions 1214, thus clearly distinguishing claim 10 from the improper and ambiguous figure of the cited reference.

Independent claims 10, 13, 25, 30, 33, 38 and 40 have been similarly amended as appropriate to distinguish the independent claims from the improper figure of the cited reference. The dependent claims are seen as being in patentable condition at least as depending from claims shown above to be patentable. In view of the above noted arguments and claims amendments, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

§103 Rejection of the Claims

Claims 17-24 and 34-37 were rejected under 35 USC § 103(a) as being unpatentable over Grubisich (U.S. Patent No. 5,581,115). Applicant respectfully traverses this rejection.

The cited reference of Grubisich has features that have been discussed previously and include a method of increasing the base doping 76 along the edge of the field isolation oxide structure 64 to increase the emitter 70A to collector 66 breakdown voltage and reduce the emitter to collector leakage current along the field isolation edge (see figure 3A, 3B and column 8, line 21 to column 10, line 7). The special collector zone 88 (as shown in figures 3, 4, 5, 6, 7 and 8) is formed *through* the emitter opening and necessarily has the *same lateral extent as the emitter* in one horizontal direction, and a lateral extent that is *less than* the emitter in what is called the "walled" direction.

Applicant respectfully submits that the cited reference does not describe or suggest an implanted region at the collector base junction that is larger than the emitter. Applicant further

submits that there is no suggestion in the cited reference that there would be a benefit to making the special collector zone 88 larger than the emitter to base area, and thus can provide no motivation to one of ordinary skill to make the suggested combination of references. Thus the cited reference teaches an implant that has the same lateral extent as the emitter in one horizontal direction, and a smaller lateral extent than the emitter in the other horizontal direction.

Independent claim 17 recites “...*a first implant region interposed between the collector region and the base region, the implant region having an increased doping of an implant impurity and having an effective surface area greater than the surface area of the emitter region contiguous to the base region and less than the area of the base region contiguous to the collector region; and a second implant region formed in the collector region ...*”. The cited reference discloses a special collector zone 88 that has the same lateral extent as the emitter 70 in one direction, and a smaller lateral extent than emitter 70 in the perpendicular horizontal direction (i.e., the walled direction).

The outstanding Office Action suggests at page 8 that “Grubisich discloses in figure 5a, an implant region 90 in the BJT device shown in the figure”. Applicant respectfully disagrees with the Examiner and submits that the region 90 is a diffusion and not an implant as discussed in column 10, lines 16-24, and such is also clear from the region 90 being shown as N+. The cited reference does not disclose or suggest that there would be a reason or method to form a region 88 that was larger than the emitter, and actively teaches away from this feature by pulling the edges of the region 88 away from the “walled” edges of the emitter 70, which feature is discussed in the specification of the cited reference at least at column 10, line 7. The cited reference, whether taken alone or in any combination with well know prior art, does not describe or suggest the claimed feature of an implanted collector region that is *greater than the surface area of the emitter*, and is thus an inappropriate obviousness reference. Applicant respectfully requests that this rejection of independent claim 10 be reconsidered and withdrawn.

Independent claim 34 has similar claim language to claim 17 discussed above, specifically that the implant area is greater than the emitter and less than the base region. The dependent claims are seen as being patentable at least as being dependent on base claims shown above to be patentably distinct and non-obvious over the reference. Applicant therefore requests that this rejection be reconsidered and withdrawn.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, David Suhl, at (508) 865-8211 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

MICHAEL P. VIOLETTE

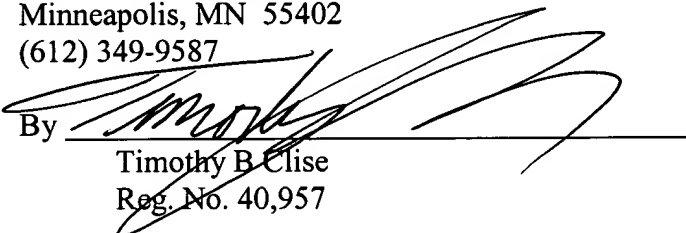
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21 April '05

By


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